

*Hawley's*

*Condensed Chemical*

*Dictionary*

**THIRTEENTH EDITION**

*Revised by*

Richard J. Lewis, Sr.



VAN NOSTRAND REINHOLD

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Printed in the United States of America

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Van Nostrand Reinhold  
115 Fifth Avenue  
New York, NY 10003

Chapman & Hall  
2-6 Boundary Row  
London  
SE1 8HN  
United Kingdom

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102 Dodds Street  
South Melbourne, 3205  
Victoria, Australia

Nelson Canada  
1120 Birchmount Road  
Scarborough, Ontario  
Canada M1K 5G4

Chapman & Hall GmbH  
Pappelallee 3  
69469 Weinheim  
Germany

International Thomson Publishing Asia  
221 Henderson Road #05-10  
Henderson Building  
Singapore 0315

International Thomson Publishing Japan  
Hirakawacho Kyowa Building, 3F  
2-2-1 Hirakawacho  
Chiyoda-ku, 102 Tokyo  
Japan

International Thomson Editores  
Seneca 53  
Col. Polanco  
11560 Mexico D.F. Mexico

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97 98 99 00 01 HAM 10 9 8 7 6 5 4 3 2 1

Library of Congress Cataloging-in-Publication Data

Condensed chemical dictionary.

Hawley's condensed chemical dictionary.—13th ed./revised by  
Richard J. Lewis, Sr.  
p. cm.  
ISBN 0-442-02324-3 (hardcover)

I. Chemistry—Dictionaries. I. Hawley, Gessner Goodrich, 1905–1983.  
II. Lewis, Richard J., Sr. III. Title.

QD5.C5 1997

540'.3—dc21

97-35762

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from *Streptomyces flocculus*. Dark brown, rectangular crystals.

**stress.** The deformation undergone by a material when subjected to a definite load (the force applied per unit area). The load may be static (constant) or dynamic (increasing at a uniform rate). In either case it induces a strain in the material that results in rupture if the deforming force exceeds its strength.

See strain; modulus of elasticity.

**stress cracking.** (tension cracking). Development of transverse cracks in a rubber or plastic product exposed to atmospheric oxygen at low (5–10%) elongation for long periods of time, for example, coiled hose, packaging materials, etc., both in service and during storage. Cracking will occur in the absence of light. It can be minimized in the case of a plastic such as polyethylene by lowering the density and the melt index, and in rubber by use of antioxidants.

**stripping.** (1) Removal of relatively volatile components from a gasoline or other liquid mixture by distillation, evaporation, or by passage of steam, air, or other gas through the liquid mixture. (2) Rapid removal of color from an improperly dyed fabric or fiber by a chemical reaction. Compounds used for this purpose in vat dyeing or in discharge printing are termed *discharging agents*. Substances commonly used as strippers are sodium hydrosulfite, titanous sulfate, sodium and zinc formaldehyde sulfoxylates.

**strontia.** See strontium oxide.

**strontianite.**  $\text{SrCO}_3$ , Natural strontium carbonate. Properties: White, gray, yellow, green color; vitreous luster. Mohs hardness 3.5–4, d 3.7. Occurrence: California, New York, Washington, Germany, Mexico. Use: Source of strontium chemicals.

**strontium.** Sr. Metallic element of atomic number 38, group IIA of periodic table, aw 87.62, valence = 2, radioactive isotopes strontium-89 and strontium-90. There are four stable isotopes.

Properties: Pale-yellow, soft metal; chemically similar to calcium. D 2.54, mp 752, bp 1390C. Soluble in alcohol and acids; decomposes water on contact.

Occurrence: Ores of strontianite and celestite (Mexico, Spain).

Derivation: (1) Electrolysis of molten strontium chloride in a graphite crucible with cooling of the upper, cathodic space; (2) thermal reduction of the oxide with metallic aluminum (strontium aluminum alloy formed), and distilling the strontium in a vacuum.

Grade: Technical.

**Hazard:** Spontaneously flammable in powder form, ignites when heated above its mp. Reacts with water to evolve hydrogen. Store under naphtha.

Use: Alloys, "getter" in electron tubes.

### strontium-90.

Radioactive strontium isotope. Properties: Half-life is 38 years. Radiation:  $\beta$ . Derivation: From the fission products of nuclear reactor fuels.

Available forms: A mixture containing strontium-90, yttrium-90, and strontium-89 chlorides in hydrochloric acid solution; also as the carbonate and titanate.

**Hazard:** Highly toxic radioactive poison; present in fallout from nuclear explosions. Absorbed by growing plants; when ingested attacks bone marrow with possibly fatal results. It may be partially removed from milk by treatment with vermiculite.

Use: Radiation source in industrial thickness gauges, elimination of static charge, treatment of eye diseases, in radio-autography to determine the uniformity of material distribution, in electronics for studying strontium oxide in vacuum tubes, activation of phosphors, source of ionizing radiation in luminous paint, cigarette density control, measurement of silk density, atomic batteries, etc.

### strontium acetate.

CAS: 543-94-2.  $\text{Sr}(\text{C}_2\text{H}_5\text{O}_2)_2 \cdot 1/\text{H}_2\text{O}$ .

Properties: White, crystalline powder. Soluble in water; loses  $1/\text{H}_2\text{O}$  at 150C.

Derivation: Interaction of strontium hydroxide and acetic acid, followed by crystallization.

Use: Intermediate for strontium compounds, catalyst production.

### strontium bromate.

$\text{Sr}(\text{BrO}_3)_2 \cdot \text{H}_2\text{O}$ .

Properties: Colorless or yellowish crystals, lustrous powder, hygroscopic. D 3.773, loses water at 120C, decomposes at 240C. Soluble in water.

**Hazard:** Strong oxidant, fire risk in contact with organic materials.

### strontium bromide.

CAS: 10476-81-0.  $\text{SrBr}_2 \cdot 6\text{H}_2\text{O}$ .

Properties: White, hygroscopic crystals or powder. D 2.386 (25/4C), loses 4 $\text{H}_2\text{O}$  at 89C, losing remaining water by 180C; mp (anhydrous salt) 643C. Soluble in water, alcohol, and amyl alcohol; insoluble in ether.

Derivation: Strontium carbonate is treated with bromine or hydrobromic acid.

Grade: Anhydrous powder, crystals, technical, CP.

**Hazard:** Toxic by ingestion and inhalation.

Use: Medicine (sedative), lab reagent.

### strontium carbonate.

$\text{SrCO}_3$ .

Properties: White, impalpable powder. D 3.62, loses carbon dioxide at 1340C. Soluble in acids, carbonated water, and solutions of ammonium salts; slightly soluble in water.

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